PATENT SPECIFICATION

841305

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Machines for rolling Webs of Material

We, JAGENBERG WERKE A. G., a Company registered under the laws of the German Republic of Himmelgeister Strasse 107, Dusseldorf, Germany, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to machines for rolling webs of material on to reels and particularly to machines of the type (hereinafter referred to as "the type described") for rolling webs of material on to reels arranged end to end so as to have a common longitudinal axis, the reels being peripherally supported by a plurality of rollers, at least one of which is arranged to impart the necessary motion to the reels.

Machines of the type described are used, for example, in the paper industry where it is normal to mount the reels upon a rotatable shaft to constitute a winding core. Experience shows that such machines have several disadvantages: for example, the reel-carrying shaft is awkward to mount and dismount, and indeed considerable floor space has to be left free in the neighbourhood of the machines for the carrying out of the mounting and dismounting operations; moreover, when the machine is in use, axial movement of the shaft and relative movement between the reels and the shaft frequently result in the material being unevenly and irregularly wound upon the reels.

According to one aspect of the present invention there is provided a machine of the type described for rolling webs of material on to reels wherein the reels are held in end to end engagement to form a rigid core during the rolling operation solely by means operable to apply an inward axial pressure directly to the reels.

According to a further aspect of the present invention there is provided a method of rolling webs of material on to reels comprising the steps of placing the reels upon supporting rollers, the reels being arranged end to end so as to have a common longitudinal axis and at least one of the supporting rollers being adapted to be driven, engaging rotatable clamping pins within apertures provided in the remote end faces of the outermost reels, adjusting the pins in a direction parallel to the longitudinal axis of the reels until the reels are held in end to end engagement to form a rigid core, attaching each web to a part of the periphery of a different one of the reels, and driving the roller.

Several embodiments of the invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a partly-sectioned plan view of one end of a machine according to a first embodiment of the invention.

Fig. 2 is a side elevation of the machine shown in Fig. 1.

Fig. 3 is a partly-sectioned front elevation of the machine shown in Fig. 1.

Fig. 4 is a schematic view of a machine incorporating a second embodiment of the invention.

Fig. 5 is a schematic view of a machine incorporating a third embodiment of the invention.

Fig. 6 is a schematic view of a machine incorporating a fourth embodiment of the invention, and

Fig. 7 is a side view of the machine illustrated in Fig. 6.

The drawings illustrate one end only of the several machines now to be

described. It will be appreciated, however, that both ends of each machine are identical.

Referring now to Figs. 1, 2 and 3 of the drawings, rollers 19 and 20 are rotatably mounted in the framework of the machine, and are connected to a motor (not shown) by means of which they may be driven when required. A hollow shaft 6, also rotatably mounted in the framework of the machine, extends across the machine parallel to the rollers 19 and 20. A forked link 4 is arranged to be rotatable about the longitudinal axis of the shaft 6 under the action of a counterweight 7.

The link 4 pivotally supports a substantially T-shaped member 3 which carries at the end of its arm 3a a rotatably mounted clamping pin 1 surmounting a bush 2. The clamping pin 1 is of cylindrical formation over the major part of its length but is provided at its outer end with a frustro-conical portion capable of engaging within the open end of a reel 18. The member 3 is provided with a counterweight 5 arranged so that it tends to counter balance the weight of the arm 3a. Thus the member 3 and the forked link 4 may be regarded as elements together constituting an articulated lever, one end of which is pivotally arranged relative to the longitudinal axis of the shaft 6, while the other end carries the rotatable clamping pin 1.

A threaded spindle 8 is rotatably mounted within the shaft 6 and carries a nut 9 equipped with two lugs 9a which project outwardly from, and perpendicular to, the spindle 8. Each of the lugs 9a extends through a respective slot 10 formed in the shaft 6 and engages within a groove 11 with which the link 4 is provided. The threaded spindle 8 may be rotated by means of a cranked extension 12 and may be restrained against axial movement by means of a lever 13 pivotally mounted at 14 and spring urged into holding engagement with an abutment piece 13a. The lever 13 is provided with a handle 17.

When the spindle 8 is restrained against axial movement in this manner, rotation thereof will cause the nut 9 to travel along it and thus move the link 4 along the shaft 6.

When it is required to do so, the spindle 8 may be locked against further rotation by the engagement of a latch 15, pivotally mounted on the framework of the machine, with a catch wheel 16 mounted on the spindle 8 externally of the machine framework.

In operation of the machine illustrated in Figs. 1, 2 and 3, a group of reels 18 corresponding in number to the number of webs to be rolled, are placed end to end upon the supporting rollers 19 and 20. (Although it has been found that a machine according to the invention will work efficiently with any number of reels, for example, from one to twelve, practice has shown that it is most efficient when more than one reel is used.) The link 4 at each end of the shaft 6 is moved there-along by means of the spindle 8, as described above, until the rotatable clamping pins 1 carried by the pivotable arms 3a may be inserted into the remote open ends of the group of reels 18.

The movement of the links 4 is continued until the clamping pins 1 exert sufficient axial pressure on the group of reels 18 to render them, in effect, a single rigid core and to constrain them against axial movement. The webs are then attached to their respective reels, the rollers 19 and 20 are made to rotate under the action of the motor (not shown) and the winding process is thus commenced. As the winding proceeds and the diameter of the rolls increases, the arms 3a pivot about the shaft 6 as shown in broken lines in Fig. 2.

In a machine incorporating a second embodiment partly illustrated in Fig. 4, a lever 25 is pivotally mounted, by means of a sleeve 26, on an internally screw-threaded bush 26a. The latter is mounted on an externally screw-threaded spindle 23 which constitutes an element of the machine frame. A handle is provided at the end of the spindle 23 so that the latter may be rotated. The spindle 23 may be held against axial movement by means which is not shown but which comprises a lever and abutment piece similar to those shown at 13 and 13a respectively in Figure 3; moreover the spindle 23 may be locked against rotation by means which is not illustrated in Figure 4 but which comprises a latch and a catch wheel similar to those shown at 15 and 16 respectively in Figure 3. A sleeve 24 is displaceably mounted on the lever 25 and a clamping pin 22 (similar to the pin 1 described above) is rotatably connected to the sleeve 24 for engagement within the open end of a reel 21. Thus in this second machine the distance between the longitudinal axis of the threaded spindle 23 and the axis of rotation 27 of the reel 21, is variable.

The same effect is attained in a

third machine partly illustrated in Figure 5. In this case a clamping pin 29 (similar to the pin 1 of the first machine) is rotatably mounted on a lever 30 for engagement within the open end of a reel 28. The lever 30 is arranged to slide within a sleeve 32 which in turn is rotatably mounted on an internally screw-threaded bush 32a. The latter is mounted on an externally screw-threaded spindle 31 which constitutes an element of the machine frame. It will be seen that the distance between the longitudinal axis of the spindle 31 and the axis of rotation of the reel 28 is variable. The spindle 31 may be held against axial movement and locked against rotation by means not shown in Figure 5 but identical with those described in respect of the second embodiment.

It will be appreciated that if the spindles 23 (Fig. 4) and 31 (Fig. 5) are restrained against axial movement and then rotated as previously described, the bushes 26a and 32a, and thus the pin-carrying levers 25 and 30, will travel along their respective spindles 23 and 31 so that the pins 22 and 29 may be caused to exert an inward axial pressure along the reels 21 and 28 respectively.

In the unusual event of the supporting rollers being of different diameters, the upward movement of the core due to the increasing diameter of the rolls during the winding operation, will not be in a plane normal to the plane connecting the centre lines of the rollers. It will be appreciated that in the three machines already described, however, provision is made for the clamping pins to be held in their constraining positions in such an event: in the machine described with reference to Figs. 1, 2 and 3, the effective distance between the shaft 6 and the pin 1 is automatically varied, to enable the pin 1 to be held in its constraining position, by the pivoting about the shaft 6 of the link 4, one of the elements constituting the articulated lever which carries the pin; in the machines illustrated in Figs. 4 and 5 the effective distance between the clamping pins and the axes of the spindles 23 and 31, respectively, is made automatically variable by the introduction of the displaceable sleeves 24 and 32, respectively.

In the machine one end of which is illustrated in Figs. 6 and 7, a clamping pin 37 is engageable within the open end of a reel 35 supported on rollers 33 and 34, the pin 37 being rotatably mounted on an externally-threaded tube 38. The tube 38 is supported in a threaded aperture formed in a bar member 39 and is provided with a cranked handle 45 so that the tube may be rotated and thus moved through the aperture either towards or away from the reel 35. The bar-member 39 is displaceably mounted between guide members, comprising opposing rollers 41, 42 and associated guide shoulders 43, 44, mounted on the stationary frame-work 40 of the machine.

Prior to the winding process, the handles 45 are rotated at each end of the machine, thus causing the associated pins 37 to move inwardly until they are engaged within the remote open ends of a group of reels 35. The webs (not shown) are then attached to their respective reels 35, a roller 36 is placed on the reel group to hold the reels in position against the rollers 33 and 34 and the winding process is begun. As winding proceeds and the diameter of the rolls increases, the resulting upward movement of the reels 35 relative to the rollers 33, 34, causes the bar-member 39 to be displaced upwardly between the rollers 41, 42 and the guide shoulders 43, 44.

It will be appreciated that a machine for winding webs of material according to the present invention, in that it eliminates the use of a reel-carrying shaft, presents definite advantages over previously known machines.

WHAT WE CLAIM IS:

1. A machine of the type described for rolling webs of material on to reels wherein the reels are held in end to end engagement to form a rigid core during the rolling operation solely by means operable to apply an inward axial pressure directly to the reels.

2. A machine according to claim 1 wherein the means is so mounted in relation to the framework of the machine that it permits the upward movement of the reels which is caused by the increasing diameter of the rolls.

3. A machine according to claim 1 and claim 2 wherein the means comprises a pair of rotatable clamping pins engageable within apertures located in the remote end faces of the outermost reels.

4. A machine according to claim 3, wherein the pins are carried by articulated levers which are adjustable and lockable in a direction parallel with the longitudinal axis of the reels and which are pivotally arranged on the framework of the machine.

5. A machine according to claim 4 wherein the pins are mounted on the free ends of first elements of the

articulated levers.

6. A machine according to claim 5 wherein the free ends of second elements of the articulated levers are pivotally mounted on a shaft in the framework of the machine.

7. A machine according to claim 4 wherein the articulated levers are adjustable by means comprising threaded spindles.

8. A machine according to claim 3 wherein the pins are carried by sleeves displaceably mounted on levers, the levers being arranged to pivot about an element of the machine frame and being adjustable and lockable in a direction parallel with the longitudinal axis of the reels.

9. A machine according to claim 8 wherein the levers are adjustable by means comprising threaded spindles.

10. A machine according to claim 3 wherein the pins are carried by levers which are displaceably mounted in sleeves arranged to rotate about an element of the machine framework.

11. A machine according to claim 3 wherein the pins are connected by adjusting means to bars displaceably mounted between guide members mounted on the machine framework.

12. A machine according to claim 11 wherein the adjusting means comprises threaded spindles on which the pins are mounted and which are carried by the bars.

13. A machine according to claims 11 and 12 wherein the guide members comprise rollers.

14. A method of rolling webs of material on to reels comprising the steps of placing the reels upon supporting rollers, the reels being arranged end to end so as to have a common longitudinal axis and at least one of the supporting rollers being adapted to be driven, engaging rotatable clamping pins within apertures provided in the remote end faces of the outermost reels, adjusting the pins in a direction parallel to the longitudinal axis of the reels until the reels are held in end to end engagement to form a rigid core, attaching each web to a part of the periphery of a different one of the reels, and driving the roller.

15. A machine for rolling webs of material on to reels, substantially as herein described with reference to Figs. 1, 2 3, or Fig. 4 or Fig. 5 or Figs. 6 and 7 of the accompanying drawings.

16. A method of rolling webs of material on to reels substantially as herein described with reference to the accompanying drawings.

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841,305 COMPLETE SPECIFICATION

3 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEET 1

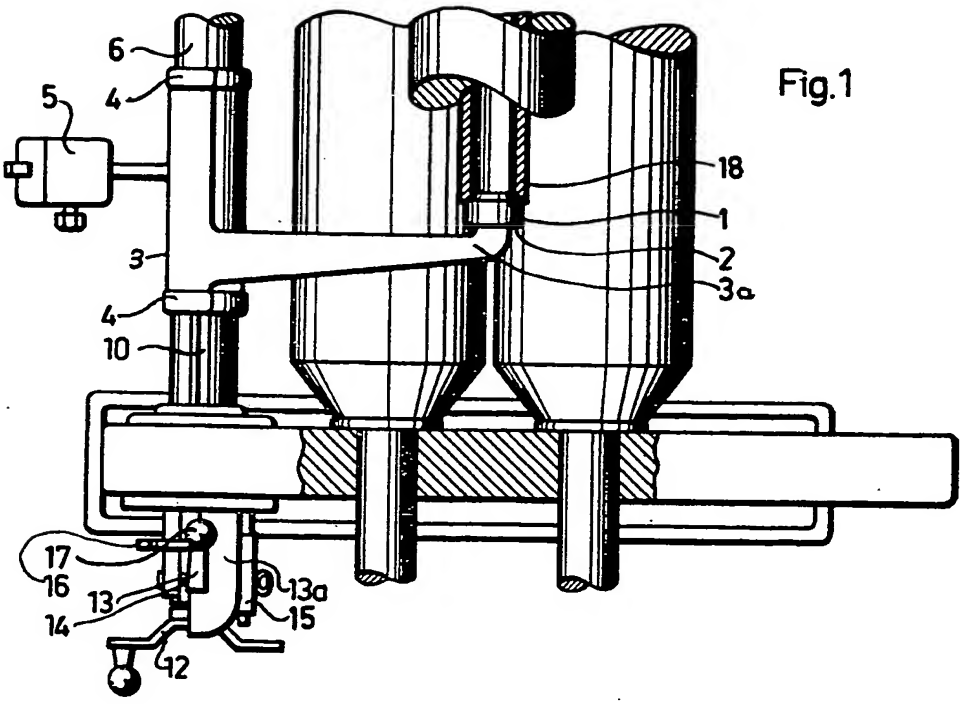


Fig.1

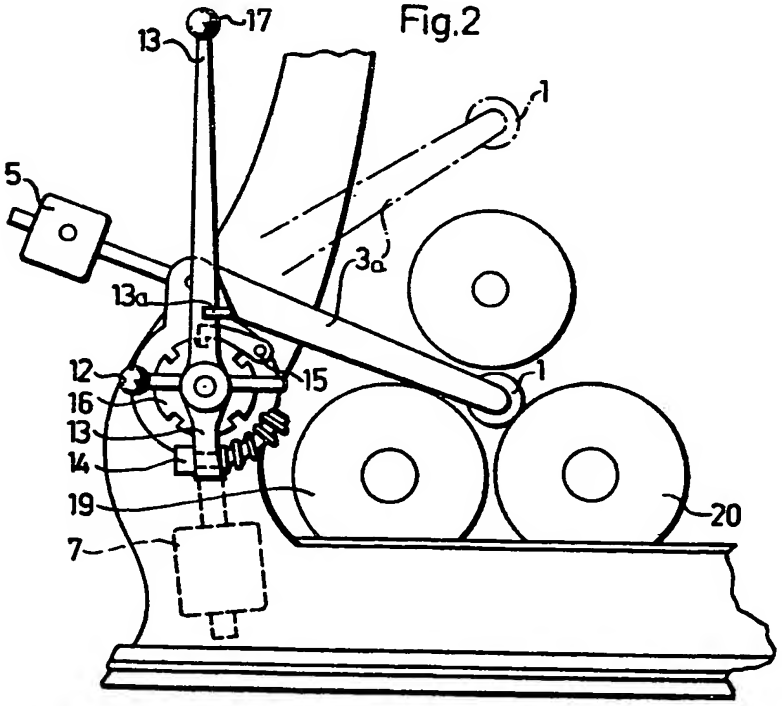


Fig.2

Fig. 3

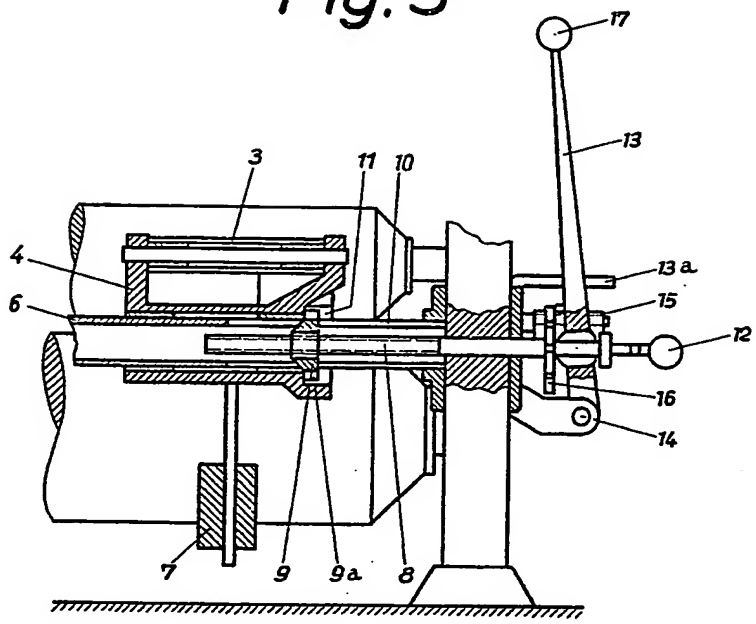


Fig. 4

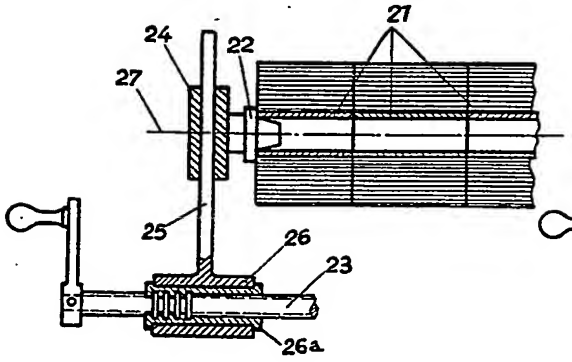
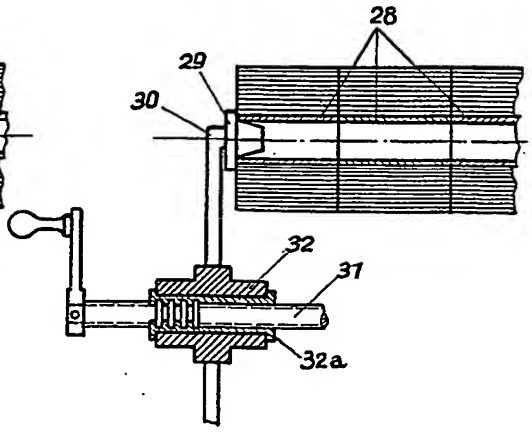


Fig. 5



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This drawing is a reproduction of the Original on a reduced scale.
SHEETS 2 and 3

Fig. 6

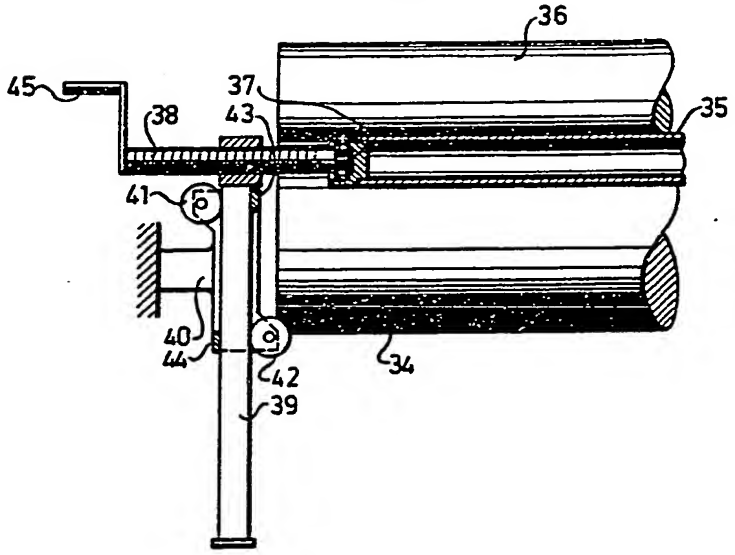
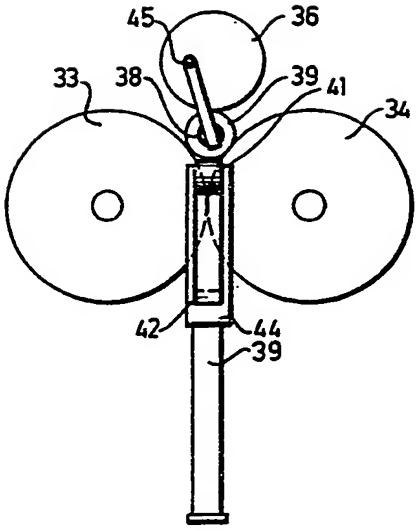


Fig. 7



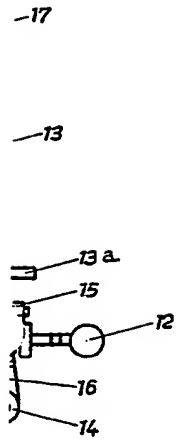
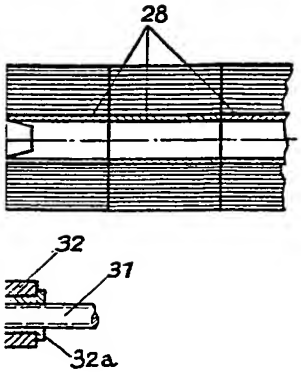


Fig. 5



841,305 COMPLETE SPECIFICATION

3 SHEETS *This drawing is a reproduction of the Original on a reduced scale. SHEETS 2 and 3*

Fig. 3

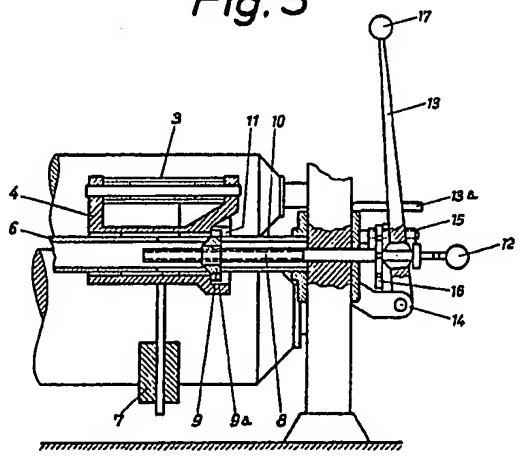


Fig. 6

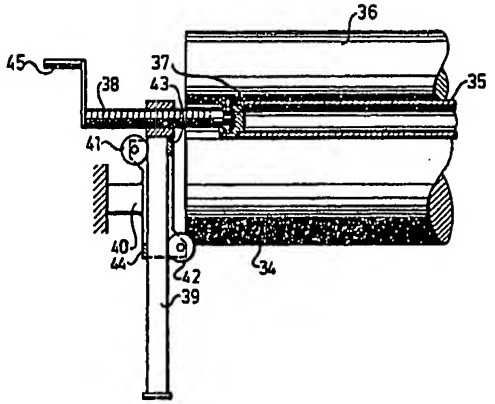


Fig. 7

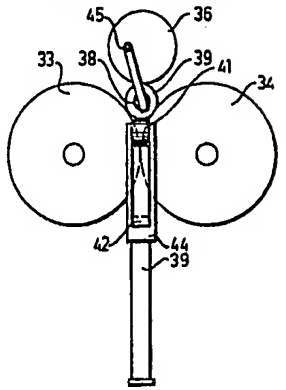


Fig. 4

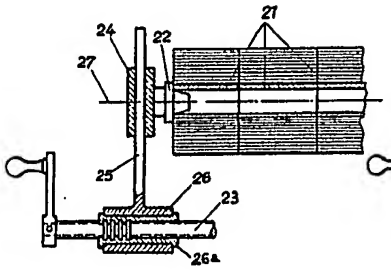


Fig. 5